

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)**

To:

see form PCT/ISA/220

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/GB2005/000857

International filing date (day/month/year)
07.03.2005

Priority date (day/month/year)
05.03.2004

International Patent Classification (IPC) or both national classification and IPC
C12N15/82, A01H5/00, A01H5/10

Applicant
THE UNIVERSITY OF BATH

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2005/000857

IAP5 Rec'd PCT/PTO 01 SEP 2006

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☒ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☒ in written format
 - ☒ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☒ furnished subsequently to this Authority for the purposes of search.
3. ☒ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. ☒ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43*bis*.1 and 64.1) is the claimed priority date.
2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application,
- ☒ claims Nos. 1-45,47-62,64-65,74-126, 128-146,157-164, 46, 127, 129

because:

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☒ no international search report has been established for the whole application or for said claims Nos. 1-45,47-62,64-65,74-126, 128-146,157-164, 46, 127, 129
- ☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:
 - the written form ☐ has not been furnished
 - ☐ does not comply with the standard
 - the computer readable form ☐ has not been furnished
 - ☐ does not comply with the standard
- ☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.
- ☐ See separate sheet for further details

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:
- ☐ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☒ not paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. 46,63,66-73,127,147-156,165

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	46,63,66-73,127,147-156,165
Inventive step (IS)	Yes: Claims	
	No: Claims	46,63,66-73,127,147-156,165
Industrial applicability (IA)	Yes: Claims	46,63,66-73,127,147-156,165
	No: Claims	

2. Citations and explanations

see separate sheet

Re item 3.

Present claims 1-45, 47-62, 63-65, 74-126, 128-146, 157-164 relate to a method and plants which have been defined merely by a desired effect without any further characterizing feature. A meaningful search on the basis of the "result to be achieved" definition cannot be carried out.

In addition, the description does not provide support and disclosure in the sense of Article 6 and 5 PCT for the multitude of compounds and use of said compounds in methods having the said desired property or effect and there is no common general knowledge of this kind available to the person skilled in the art. This non-compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non-compliance in determining the extent of the search of the claim (PCT Guidelines 9.19 and 9.20).

The search and examination was consequently restricted to the specifically disclosed compound i.e. the mnt gene and methods using the mnt gene.

Re item 4.

The present application does not comply with the requirements of unity of invention and 5 separate inventions have been identified. Each of them is characterized by an individual "special technical feature"; there is no interrelation between these inventions in the form of one or more of the same or corresponding special technical features, which define a contribution which each of the claimed inventions considered as a whole makes over the prior art (Rule 13.2 PCT). The applicant is therefore asked to pay additional search fees. Otherwise the Search report will be limited to the first invention specified below.

The present application relates to a method of modifying cell proliferation in a plant and plants derived by said method.

The technical problem is said in the application as filed to consist in the provision of plants that produce seeds with increased size. The alleged solution to this problem is the transformation of the plant with different genes which modify cell proliferation.

The problem addressed by the present application has already been an issue in several documents of the prior art (see citations made in the description of the present application and as disclosed in e.g. in WO2002/15675 which consists in the provision of a cDNA encoding a transcription factor and the preparation of transgenic plants with altered traits). As a consequence of the prior art, the Search Division is of the opinion that there is no single inventive concept underlying the plurality of claimed inventions in the sense of Article 13.1 PCT. The present set of claims thus embraces 5 individual independent solutions to the above problem. These are as follows:

Invention 1:

Problem 1: Provision of a method for improving seed size.

Solution 1: Modulation of the gene encoding mnt

Invention 2:

Problem 2: Provision of a method for improving seed size

Solution 2: Modulation of the gene encoding IPT1

Invention 3:

Problem 3: Provision of a method for improving seed size

Solution 3: Modulation of the gene encoding ARGOS

Invention 4:

Problem 4: Provision of a method for improving seed size

Solution 4: Modulation of the gene encoding CYCD3:1

Invention 5:

Problem 5: Provision of a method for improving seed size

Solution 5: Modulation of the gene encoding CYCB1:1

Each of these separate inventions has its own relevant prior art to be determined, requiring independent searches to be conducted. As a consequence, the search of all of these separate would require considerable additional effort. It should be noted, however, that separate search strategies may lead to overlapping sets of documents, which does not mean that the additional search has not been cumbersome and consequently did not require additional effort.

Re item V.

The present report has been established on the invention first mentioned in the claims i.e. a method of modifying the *mnt* gene and the plants derived by said method.

The following documents are referred to in the present report:

- D1: DATABASE EMBL [Online] 24 October 2002 (2002-10-24), "Arabidopsis thaliana clone RAFL07-10-G12 (R10939) auxin response factor (At5g62000) mRNA, complete CDs." XP002346124 retrieved from EBI accession no. EM_PRO:BT000784 Database accession no. BT000784
- D2: WO 01/35725 A (MENDEL BIOTECHNOLOGY, INC; JIANG, CAI-ZHONG; HEARD, JACQUELINE; PINEDA) 25 May 2001 (2001-05-25)
- D3: WO 03/013227 A (MENDEL BIOTECHNOLOGY, INC; RATCLIFFE, OLIVER; RIECHMANN, JOSE, LUIS; A) 20 February 2003 (2003-02-20)
- D4: WO 02/15675 A (MENDEL BIOTECHNOLOGY, INC; PILGRIM, MARSHA; CREELMAN, ROBERT; DUBELL,) 28 February 2002 (2002-02-28)
- D5: GUILFOYLE TOM J ET AL: "Auxin response factors" September 2001 (2001-09), JOURNAL OF PLANT GROWTH REGULATION, VOL. 20, NR. 3, PAGE(S) 281-291 , XP002346079 ISSN: 0721-7595

D2 discloses a transcription factor of *Arabidopsis thaliana* which has been used to modify traits associated with structural or developmental characteristics of plants. It is said that trait modification of particular interest include those to seeds. In addition, the transcription factor described in this document is 100% identical to the *mnt* protein as depicted in Seq. ID No. 3.

D3 also provides a transcription factor of *Arabidopsis thaliana* which when transformed into plants results in modified desirable traits. The transcription factor has 100% identity in 122 aa overlap to the protein of SEQ ID No. 6.

The *mnt* mutant cDNA has been disclosed in D4 in the same concept as the present application. The sequence described in D4 shows 99,8 % identity in 2580 nt overlap.

In view of the prior art, neither the general concept of the invention i.e. modifying traits of a plant by transcription factors, nor the use of the specific transcription factor *mnt* is new as required by Article 33(2) PCT. Therefore none of the claims fulfil the requirements of said Article.

**WRITTEN OPINION OF THE
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AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/GB2005/000857